

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In the application of:

Tetsuro ASANO *et al.*

Serial No.: 10/505,438

Filing Date: August 24, 2004

For: PROTECTING ELEMENT

Examiner: Anh D. Mai

Group Art Unit: 2814

Confirmation No.: 2447

**APPELLANTS' REPLY BRIEF**

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Reply Brief responds to the Examiner's Answer mailed September 25, 2007.

**INTRODUCTION**

There are six questions for the Board to decide in this appeal. However, those questions stem from two controlling questions: whether the word "overlap" requires that two overlapping objects be in direct physical contact; and whether, when a claim states that the distance between the outer side surface of a first high concentration impurity region formed in a insulating region and the edge of the insulating region closest to the first high concentration impurity region is 10  $\mu\text{m}$  or larger, the claimed distance must be the distance between a part of the insulating region and the part of the first high concentration impurity region that is in direct physical contact with that part of the insulating region.

In their Opening Brief, appellants explained that both questions should be answered in the negative. In the Examiner's Answer, the Examiner reproduced the rejections provided in the Final Rejection dated September 18, 2006, word for word, at pages 2-12 of the Examiner's Answer. Appellants have already explained the deficiencies of these rejections in the Opening Brief. Furthermore, the Examiner's arguments in the Response to Argument section at pages 12-27 of the Examiner's Answer do not rise to the level of rebuttal sufficient to overcome appellants' arguments, as explained below.

**A. WRITTEN DESCRIPTION REJECTION OF CLAIMS 20-38**

The gist of the Examiner's response is that "two regions 201 and 202 are clearly separated by the insulation region 203." Examiner's Answer, page 13. Since the Examiner construes the claimed overlapping of the two impurity regions to mean that the two impurity regions must be in direct physical contact, the Examiner maintains that the disclosure of the specification does not support claims 20-38.

In the Opening Brief, appellants explained that claim 20 itself states that the two impurity regions overlap so that a portion of the insulating regions is disposed *between* their inner side surfaces. The word "between" does not require direct physical contact of the inner side surfaces. Rather, the word defies it. The specification provides ample examples of the claimed overlapping, and the plain meaning of the word "overlap" is "to extend over or pass and cover a part of." Thus, the Examiner's interpretation of the claim language to require a direct physical contact between overlapping objects, is not proper. Opening Brief, Section VII.D.

**B. WRITTEN DESCRIPTION REJECTION OF CLAIMS 32, 37 AND 39-42**

In the Final Action, the Examiner construed the expression "the edge of the insulating region closest to the first high concentration impurity region" to mean the portion of the insulating region in direct physical contact with the first high concentration impurity region itself. In the Examiner's view, the claimed distance does not have support because the claimed distance must be always zero based on the Examiner's interpretation.

Appellants have already explained that this interpretation goes against any reasonable interpretation by persons skilled in the art, because such an interpretation would make meaningless the express claim limitation that the distance from the edge is 10  $\mu\text{m}$  or larger. Persons of skilled in the art would have known that the claimed edge is part of the counter of the insulating region based on the disclosure in the specification. Because this lack of written description rejection is based on a faulty interpretation of the claim language, the rejection is not proper. Opening Brief, Section VII.B.

**C. ANTICIPATION REJECTION OF CLAIMS 20, 24-31, 34, 36 AND 38**

In the Final Action, the Examiner seemed to base this anticipation rejection more on indefiniteness and lack of written description grounds than on the prior art itself. In the Opening Brief, appellants explained that such grounds cannot provide the basis for an anticipation rejection. In the Examiner's Answer, the Examiner responds that the claimed overlapping is disclosed by Asano because Asano's insulating region 145 is placed between Asano's impurity regions 160 and 161. Examiner's Answer, page 16.

First, the interpretation of the word "overlap" by the Examiner in this anticipation rejection is in direct conflict with the Examiner's interpretation of the word as requiring direct physical contact between the overlapping objects, which the Examiner relied upon to find the claims indefinite or lacking written description as explained in Section A of this Brief. The Examiner should have withdrawn the indefiniteness and lack of written description rejections, because the Examiner adopts appellants' interpretation of the word "overlap" to find Asano to anticipate the claimed invention.

Appellants have already explained that, under the plain meaning of the word "overlap," i.e., "to extend over or pass and cover a part of," Asano's FIGS. 18A-18C do not disclose the claimed overlapping. Amendment filed June 1, 2006, page 11. In addition to the arguments already presented, in this Reply appellants point out that Asano's FIG. 18B, which the Examiner relies on the teachings of the horizontal configuration of Asano's device, is a cross-section that is

cut along a bending line to show relevant features in a single sectional view. As a result, FIG. 18B does not provide basis for horizontal configuration of Asano's impurity regions 160 and 161, while Asano's FIG. 18C provides such basis.

Furthermore, even when Asano's impurity regions 160 and 161 do overlap, they do not correspond to the impurity regions of the claimed protecting element because Asano's device is not configured to form the discharging current path as claimed. Claim 26 state that upon discharging of electrostatic energy applied between the first and second terminals a current path is formed in the insulating region from an outer side surface of the first high concentration impurity region to the second high concentration impurity region. This reaching back of the discharging current never happens in Asano's device.

First, the impurity region 160 surrounds pad electrode 170a. When the discharging current is formed between the two terminals, i.e., gate terminal (170b) and source terminal (170a), the current is pulled by the pad electrode 170a under the static charge. Thus, the discharging current does not come back to the outer side surface of the impurity region 160. In short, the discharging current would look like the one shown in FIG. 16B of this application, except that part of the wider impurity region is replaced by the pad electrode 170b.

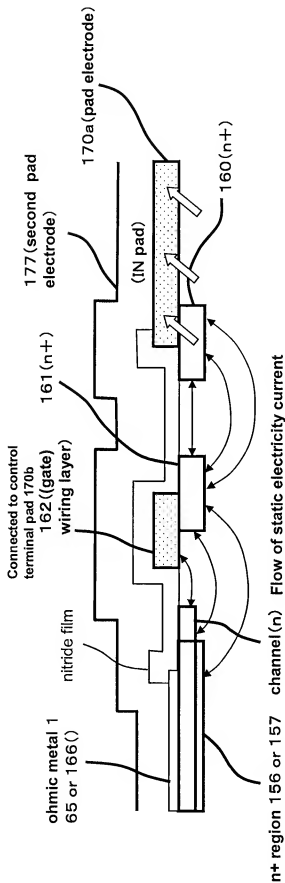
Second, the impurity region 161 is backed by channel layer 152, as shown in FIG. 18C of Asano. Because the channel layer 152 is connected to the source terminal (170a), an additional discharging current is also formed between impurity region 161 and the channel layer 152. This additional current prevents the discharging current between the impurity regions 160 and 161 from reaching the outer side surface of the impurity region 161. As a result, the device of Asano's FIGS. 18A-18C does not correspond to the claimed protecting device. Appellants attach to this Reply a drawing to show the discharging currents discussed above.

### **CONCLUSION**

For the foregoing reasons and reasons previously stated, appellants respectfully request that all of the rejections be reversed.



The discharging currents in Fig. 18C of Asano when impurity regions 160 and 161 overlap



The discharging currents in this application (for example, Fig. 6)

